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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,626	06/20/2001	Hans Bruggemann	10537/126	4532

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KENYON & KENYON  
ONE BROADWAY  
NEW YORK, NY 10004

EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 04/24/2003

16

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/885,626

Applicant(s)  
Bruggemann et al.

Examiner  
Tu M. Nguyen

Art Unit  
3748



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Apr 8, 2003
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 14-25 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jun 20, 2001 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some\* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                              | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)          | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ | 6) <input type="checkbox"/> Other:  |

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### DETAILED ACTION

1. An Applicant's Amendment filed on April 8, 2003 have been entered.

Claims 14, 22, and 25 have been amended. Overall, claims 14-25 and are pending in this application.

#### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 14-16, 19, 20, and 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Araki et al. (U.S. Patent 5,850,735).

Re claims 14, 15, 22, and 25, as shown in Figure 9, Araki et al. disclose an emission control system configured for use with an internal combustion engine (1) and a method for operating such system. The system comprises:

- a particle filter (93); and
- an arrangement disposed upstream from the particle filter and configured to at least reduce clogging of the particle filter by prevention of development of ash upstream from the

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particle filter by one of transformation and maintenance of at least one of the compounds responsible for ash formation in the gaseous state, the arrangement including:

- a device (coating layers of alumina on the surface wall of the exhaust gas passages of the filter (93)) configured to collect at least a portion of the ash-forming compounds of sulfur contained in the exhaust gas (during a lean operation of the engine, SO<sub>x</sub> in the exhaust gas is oxidized by the device to form ash-forming compounds (SO<sub>3</sub> and SO<sub>4</sub>) of sulfur; SO<sub>3</sub> and SO<sub>4</sub> are then absorbed and collected onto the surface of the alumina layers (see lines 34-59 of column 15 and lines 5-16 of column 7)); and

- a device (91) configured to convert the collected ash-forming compounds of sulfur into gaseous compounds of sulfur that do not form ash (the oxidation catalyst (91) oxidizes the rich components in the exhaust gas so that the oxygen level in the exhaust gas is reduced and the temperature of the exhaust gas is raised to a level sufficiently high to maximize the transformation of the collected (SO<sub>3</sub> and SO<sub>4</sub>) into gaseous compounds (SO<sub>2</sub>) of sulfur (also see the Abstract)).

Re claim 16, in the emission control system of Araki et al., the arrangement includes a SO<sub>x</sub> collector (93).

Re claims 19 and 20, in the emission control system of Araki et al., the arrangement includes an oxidation catalyst (91).

Re claim 23, the method of Araki et al. further comprises the steps of:

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- operating the emission control system in a normal operating phase with a lean exhaust composition to store sulfur contained in the exhaust gas; and

- operating the emission control system in a regeneration phase with a rich exhaust composition to release stored sulfur as at least one gaseous compound.

Re claim 24, in the method of Araki et al., the step of operating the emission control system in the regeneration phase includes the substep of raising an exhaust temperature to between 550°C and 700°C (lines 9-46 of column 10).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17 and 18, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki et al. as applied to claims 14 and 16, respectively, above, in view of Hirota et al. (U.S. Patent 6,233,927).

Re claims 17 and 18, the system of Araki et al. discloses the inventions as cited above, however, fails to disclose that the arrangement further includes an NO<sub>x</sub> collector.

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As shown in Figure 1, Hirota et al. teach an exhaust gas purification device comprising a particle filter (7) that also absorbs SO<sub>x</sub> in the exhaust gas and a NO<sub>x</sub> collector (11) to purify harmful NO<sub>x</sub> emissions in the exhaust gas. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NO<sub>x</sub> collector taught by Hirota et al. in the system of Araki et al., since the use thereof would have reduced the emission of harmful NO<sub>x</sub> gas into the atmosphere.

Re claim 21, in the modified emission control system of Araki et al., the arrangement includes an oxidation catalyst (91).

### *Response to Arguments*

6. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that Araki et al. fail to disclose or suggest an arrangement disposed upstream from the particle filter and configured to at least reduce clogging of the particle filter by prevention of development of ash upstream from the particle filter by one of transformation and maintenance of at least one of the compounds responsible for ash formation in the gaseous state (pages 5 and 6 of Applicant's Amendment), the examiner respectfully disagrees. Applicant even suggests that Araki et al. teach away from the pending application by increasing a clogging of the filter by the ash-forming compounds (top of page 6 in Amendment).

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Araki et al. disclose a system and method to reduce the emission of harmful sulfur compounds ( $\text{SO}_3$  or particulate matter) or ash-forming compounds as defined by the pending application, into the atmosphere. As shown in Figure 9, their system comprises a device (93) which serves a dual function as an  $\text{SO}_x$  trap and a particle filter. During a lean engine operation cycle, the  $\text{SO}_x$  in the exhaust gas is oxidized by an upstream oxidation catalyst (91) to form  $\text{SO}_3$  which is then oxidized again by a catalyst washcoat layer on a surface of the device (93) to form  $\text{SO}_4$  (also in a solid state just as the  $\text{SO}_3$ ) which is then adsorbed and collected on the washcoat layer. Over a period of lean time, the collection of these solid materials ( $\text{SO}_3$  and  $\text{SO}_4$ ) on the washcoat surface decreases a cross-section flow area of the device (93), which results in a clogging of the device (93). The clogging of the device (93) is not desired in Araki et al. who occasionally switch the engine operation to a regeneration cycle to purge the device (93) of the collected  $\text{SO}_3$  and  $\text{SO}_4$ . In order to do this, Araki et al. perform a rich cycle in which a great amount of rich components (HC and CO) is present in the exhaust gas. The oxidation catalyst (91) oxidizes these rich components so that the oxygen level in the exhaust gas is reduced and the temperature of the exhaust gas is raised to a level sufficiently high such that the collected  $\text{SO}_3$  and  $\text{SO}_4$  on the surface of the washcoat layer are transformed into gaseous compounds ( $\text{SO}_2$ ) of sulfur. Since  $\text{SO}_2$  is a gas, it can easily flow through the device (93) and thus, clogging of the device can be avoided. Therefore, Araki et al. indeed disclose, suggest, and teach exactly an important feature in the pending application (i.e., they prefer to convert the ash-forming

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compounds of sulfur in the exhaust gas into a gaseous compound so that the clogging of a filter can be prevented).

In response to applicant's argument that the combination of Hirota et al. and Araki et al. is improper because none of the references discloses, teaches, or suggests an arrangement disposed upstream from the particle filter and configured to at least reduce clogging of the particle filter by prevention of development of ash upstream from the particle filter by one of transformation and maintenance of at least one of the compounds responsible for ash formation in the gaseous state (pages 9-11 of Applicant's Amendment), the examiner respectfully disagrees. As discussed in detail above, the reference of Araki et al. is shown to disclose the claimed arrangement. Thus, the combination of Hirota et al. and Araki et al. is indeed proper.

### *Conclusion*

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CAR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CAR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however,

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will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

*Communication*

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623. The fax phone number for this group is (703) 308-7763.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.

*Tu M. Nguyen*

TMN

Tu M. Nguyen

April 23, 2003

Patent Examiner

Art Unit 3748

*Thomas Denion*

THOMAS DENION  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700